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THIRTEENTH EDITION

# Investments

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Zvi Bodie | Alex Kane | Alan J. Marcus

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# Investments

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# Investments

THIRTEENTH EDITION

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## INVESTMENTS, THIRTEENTH EDITION

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# Preface

The past three decades witnessed rapid and profound change in the investments industry as well as a financial crisis of historic magnitude. The vast expansion of financial markets during this period was due in part to innovations in securitization and credit enhancement that gave birth to new trading strategies. These strategies were in turn made feasible by developments in communication and information technology, as well as by advances in the theory of investments.

Yet the financial crisis of 2008–2009 also was rooted in the cracks of these developments. Many of the innovations in security design facilitated high leverage and an exaggerated notion of the efficacy of risk transfer strategies. This engendered complacency about risk that was coupled with relaxation of regulation as well as reduced transparency, masking the precarious condition of many big players in the system. Of necessity, our text has evolved along with financial markets and their influence on world events.

*Investments*, Thirteenth Edition, is intended primarily as a textbook for courses in investment analysis. Our guiding principle has been to present the material in a framework that is organized by a central core of consistent fundamental principles. We attempt to strip away unnecessary mathematical and technical detail, and we have concentrated on providing the intuition that may guide students and practitioners as they confront new ideas and challenges in their professional lives.

This text will introduce you to major issues currently of concern to all investors. It can give you the skills to assess watershed current issues and debates covered by both the popular media and more-specialized finance journals. Whether you plan to become an investment professional, or simply a sophisticated individual investor, you will find these skills essential, especially in today's rapidly evolving environment.

Our primary goal is to present material of practical value, but all three of us have spent our careers as researchers in financial economics and find virtually all of the material

in this book to be of great intellectual interest. The capital asset pricing model, the arbitrage pricing model, the efficient markets hypothesis, the option-pricing model, and the other centerpieces of modern financial theory are as much intellectually engaging subjects as they are of immense practical importance for the sophisticated investor.

In our effort to link theory to practice, we also have attempted to make our approach consistent with that of the CFA Institute. In addition to fostering research in finance, the CFA Institute administers an education and certification program to candidates seeking designation as a Chartered Financial Analyst (CFA). The CFA curriculum represents the consensus of a committee of distinguished scholars and practitioners regarding the core of knowledge required by the investment professional.

Many features of this text make it consistent with and relevant to the CFA curriculum. Questions adapted from past CFA exams appear at the end of nearly every chapter, and references are listed at the end of the book. Chapter 3 includes excerpts from the “Code of Ethics and Standards of Professional Conduct” of the CFA Institute. Chapter 28, which discusses investors and the investment process, presents the CFA Institute's framework for systematically relating investor objectives and constraints to ultimate investment policy. End-of-chapter problems also include questions from test-prep leader Kaplan Schweser.

In the Thirteenth Edition, we have continued our systematic presentation of Excel spreadsheets that will allow you to explore concepts more deeply. These spreadsheets, available in Connect and on the student resources site ([www.mhhe.com/Bodie13e](http://www.mhhe.com/Bodie13e)), provide a taste of the sophisticated analytic tools available to professional investors.

## UNDERLYING PHILOSOPHY

While the financial environment is constantly evolving, many basic *principles* remain important. We believe that

fundamental principles should organize and motivate all study and that attention to these few central ideas can simplify the study of otherwise difficult material. These principles are crucial to understanding the securities traded in financial markets and in understanding new securities that will be introduced in the future, as well as their effects on global markets. For this reason, we have made this book thematic, meaning we never offer rules of thumb without reference to the central tenets of the modern approach to finance.

The common theme unifying this book is that *security markets are nearly efficient*, meaning most securities are usually priced appropriately given their risk and return attributes. Free lunches are rarely found in markets as competitive as the financial market. This simple observation is, nevertheless, remarkably powerful in its implications for the design of investment strategies; as a result, our discussions of strategy are always guided by the implications of the efficient markets hypothesis. While the degree of market efficiency is, and always will be, a matter of debate (in fact we devote a full chapter to the behavioral challenge to the efficient market hypothesis), we hope our discussions throughout the book convey a good dose of healthy skepticism concerning much conventional wisdom.

### **Distinctive Themes**

*Investments* is organized around several important themes:

1. The central theme is the **near-informational-efficiency of well-developed security markets**, such as those in the United States, and the general awareness that competitive markets do not offer “free lunches” to participants.

A second theme is the **risk–return trade-off**. This too is a no-free-lunch notion, holding that in competitive security markets, higher expected returns come only at a price: the need to bear greater investment risk. However, this notion leaves several questions unanswered. How should one measure the risk of an asset? What should be the quantitative trade-off between risk (properly measured) and expected return? The approach we present to these issues is known as *modern portfolio theory*, which is another organizing principle of this book. Modern portfolio theory focuses on the techniques and implications of *efficient diversification*, and we devote considerable attention to the effect of diversification on portfolio risk as well as the implications of efficient diversification for the proper measurement of risk and the risk–return relationship.

2. This text places great emphasis on **asset allocation**. We prefer this emphasis for two important reasons. First, it corresponds to the procedure that most individuals actually follow. Typically, you start with all of your money in

a bank account, only then considering how much to invest in something riskier that might offer a higher expected return. The logical step at this point is to consider risky asset classes, such as stocks, bonds, or real estate. This is an asset allocation decision. Second, asset allocation is the primary determinant of the risk–return profile of the investment portfolio, and so it deserves primary attention in a study of investment policy.

3. This text offers a **broad and deep treatment of futures, options, and other derivative security markets**. These markets are both crucial and integral to the financial universe. Your only choice is to become conversant in these markets—whether you are to be a finance professional or simply a sophisticated individual investor.

### **NEW IN THE THIRTEENTH EDITION**

The following is a guide to changes in the Thirteenth Edition. This is not an exhaustive road map, but instead is meant to provide an overview of substantial additions and changes to coverage from the last edition of the text.

#### **Chapter 1 The Investment Environment**

The chapter addresses recent controversies about stakeholder capitalism and ESG investing. It also further expands its treatment of Fintech, cryptocurrencies, and other digital assets.

#### **Chapter 2 Asset Classes and Financial Instruments**

The chapter addresses changes in markets, most notably the replacement of LIBOR with new rates such as SOFR.

#### **Chapter 3 How Securities Are Traded**

New sections on SPACs, order internalization, and the GameStop squeeze have been added to the chapter.

#### **Chapter 5 Risk, Return, and the Historical Record**

In addition to thorough updating, this chapter has been extensively reorganized to improve flow and understanding.

#### **Chapter 10 Arbitrage Pricing Theory and Multifactor Models of Risk and Return**

The discussion of multifactor models has been updated and expanded, with a focus on the adoption of new variants such as the Fama-French five-factor model.

#### **Chapter 11 The Efficient Market Hypothesis**

The debate on efficient markets has been further developed. The chapter now includes a discussion of Shiller’s fads hypothesis, as well as new material on extra-market risk factors, and a discussion of the challenges posed by

data snooping for the interpretation of empirical evidence on risk and return.

**Chapter 12 Behavioral Finance and Technical Analysis**

The material on behavioral finance now includes confirmation bias. The section on technical analysis includes a new discussion of machine learning.

**Chapter 13 Empirical Evidence on Security Returns**

This chapter has been extensively rewritten. Older material has been replaced with treatments of issues such as the so-called factor zoo, appropriate criteria for accepting a new risk factor, and the implications of disaster risk for the equity risk premium.

**Chapter 15 The Term Structure of Interest Rates**

Market segmentation is now included as another potential explanation of the term structure.

**Chapter 17 Macroeconomic and Industry Analysis**

The discussion of the macroeconomy has been updated to include lessons learned during the COVID-19 pandemic, particularly the implications of supply side and supply chain issues for inflation.

**Chapter 23 Futures, Swaps, and Risk Management**

The treatment of interest rate swaps has been updated to account for the transition away from the LIBOR rate.

**Chapter 26 Alternative Assets**

This chapter, originally entitled *Hedge Funds* now has a wider focus on *Alternative Assets*. It includes substantial coverage of private equity, including angel investing, venture capital, and leveraged buyouts.

**Chapter 28 Investment Policy and the Framework of the CFA Institute**

This chapter has been substantially reorganized, in particular, its treatment of tax sheltering and top-down asset allocation.

**ORGANIZATION AND CONTENT**

The text is composed of seven sections that are fairly independent and may be studied in a variety of sequences. Because there is enough material in the book for a two-semester course, clearly a one-semester course will require the instructor to decide which parts to include.

**Part One** is introductory and contains important institutional material focusing on the financial environment. We discuss the major players in the financial markets, provide

an overview of the types of securities traded in those markets, and explain how and where securities are traded. We also discuss in depth mutual funds and other investment companies, which have become an increasingly important means of investing for individual investors. Perhaps most important, we address how financial markets can influence all aspects of the global economy, as in 2008.

The material presented in Part One should make it possible for instructors to assign term projects early in the course. These projects might require the student to analyze in detail a particular group of securities. Many instructors like to involve their students in some sort of investment game, and the material in these chapters will facilitate this process.

**Parts Two and Three** contain the core of modern portfolio theory. Chapter 5 is a general discussion of risk and return, making the general point that historical returns on broad asset classes are consistent with a risk–return trade-off and examining the distribution of stock returns. We focus more closely in Chapter 6 on how to describe investors’ risk preferences and how they bear on asset allocation. In the next two chapters, we turn to portfolio optimization (Chapter 7) and its implementation using index models (Chapter 8).

After our treatment of modern portfolio theory in Part Two, we investigate in Part Three the implications of that theory for the equilibrium structure of expected rates of return on risky assets. Chapter 9 treats the capital asset pricing model and Chapter 10 covers multifactor descriptions of risk and the arbitrage pricing theory. Chapter 11 covers the efficient market hypothesis, including its rationale as well as evidence that supports the hypothesis and challenges it. Chapter 12 is devoted to the behavioral critique of market rationality. Finally, we conclude Part Three with Chapter 13 on empirical evidence on security pricing. This chapter contains evidence concerning the risk–return relationship, as well as liquidity effects on asset pricing.

**Part Four** is the first of three parts on security valuation. This part treats fixed-income securities—bond pricing (Chapter 14), term structure relationships (Chapter 15), and interest-rate risk management (Chapter 16). **Parts Five and Six** deal with equity securities and derivative securities. For a course emphasizing security analysis and excluding portfolio theory, one may proceed directly from Part One to Part Four with no loss in continuity.

Finally, **Part Seven** considers several topics important for portfolio managers, including performance evaluation, international diversification, active management, and practical issues in the process of portfolio management. This part also contains a chapter on alternative assets, with an emphasis on hedge funds and private equity.

# Distinctive Features

This book contains several features designed to make it easy for students to understand, absorb, and apply the concepts and techniques presented.

## CONCEPT CHECKS

A unique feature of this book! These self-test questions and problems found in the body of the text enable the students to determine whether they've understood the preceding material. Detailed solutions are provided at the end of each chapter.

### ✓ Concept Check 9.2

Data from the last 95 years for the broad U.S. equity market yield the following statistics: average excess return, 8.9%; standard deviation, 20.3%.

- To the extent that these averages approximated investor expectations for the period, what must have been the average coefficient of risk aversion?
- If the coefficient of risk aversion were actually 3.5, what risk premium would have been consistent with the market's historical standard deviation?

### Example 18.3 The Constant-Growth DDM

High Flyer Industries has just paid its annual dividend of \$3 per share. The dividend is expected to grow at a constant rate of 8% indefinitely. The beta of High Flyer stock is 1.0, the risk-free rate is 6%, and the market risk premium is 8%. What is the intrinsic value of the stock? What would be your estimate of intrinsic value if you believed that the stock was riskier, with a beta of 1.25?

Because a \$3 dividend has just been paid and the growth rate of dividends is 8%, the forecast for the year-end dividend is  $\$3 \times 1.08 = \$3.24$ . The market capitalization rate (using the CAPM) is  $6\% + 1.0 \times 8\% = 14\%$ . Therefore, the value of the stock is

$$V_0 = \frac{D_1}{k - g} = \frac{\$3.24}{.14 - .08} = \$54$$

If the stock is perceived to be riskier, its value must be lower. At the higher beta, the market capitalization rate is  $6\% + 1.25 \times 8\% = 16\%$ , and the stock is worth only

$$\frac{\$3.24}{.16 - .08} = \$40.50$$

## NUMBERED EXAMPLES

are integrated throughout chapters.

Using the worked-out solutions to these examples as models, students can learn how to solve specific problems step-by-step as well as gain insight into general principles by seeing how they are applied to answer concrete questions.

## WORDS FROM THE STREET BOXES

Short articles and financial coverage adapted from business periodicals, such as *The Wall Street Journal*, are included in boxes throughout the text. The articles are chosen for real-world relevance and clarity of presentation.

### WORDS FROM THE STREET

#### What Level of Risk Is Right for You?

No risk, no reward. Most people intuitively understand that they have to bear some risk to achieve an acceptable return on their investment portfolios.

But how much risk is right for you? If your investments turn sour, you may put at jeopardy your ability to retire, to pay for your kid's college education, or to weather an unexpected need for cash. These worst-case scenarios focus our attention on how to manage our exposure to uncertainty.

Assessing—and quantifying—risk aversion is, to put it mildly, difficult. It requires confronting at least these two big questions.

First, how much investment risk can you afford to take? If you have a steady high-paying job, for example, you have greater ability to withstand investment losses. Conversely, if you are close to retirement, you have less ability to adjust your lifestyle in response to bad investment outcomes.

Second, you need to think about your personality and decide how much risk you can tolerate. At what point will you be unable to sleep at night?

To help clients quantify their risk aversion, many financial firms have designed quizzes to help people determine whether they are conservative, moderate, or aggressive investors. These quizzes try to get at clients' attitudes toward risk and their capacity to absorb investment losses.

Here is a sample of the sort of questions that can shed light on an investor's risk tolerance.

#### MEASURING YOUR RISK TOLERANCE

Circle the letter that corresponds to your answer.

- The stock market fell by more than 30% in 2008. If you had been holding a substantial stock investment in that year, which of the following would you have done?
  - Sold off the remainder of your investment before it had the chance to fall further.
  - Stayed the course with neither redemptions nor purchases.
  - Bought more stock, reasoning that the market is now cheaper and therefore offers better deals.
- The value of one of the funds in your 401(k) plan (your primary source of retirement savings) increased 30% last year. What would you do?
  - At the end of the month, you find yourself
    - Short of cash and impatiently waiting for your next paycheck.
    - Not overspending your salary, but not saving very much.
    - With a comfortable surplus of funds to put into your savings account.
  - You are 30 years old and enrolling in your company's retirement plan, and you need to allocate your contributions across 3 funds: a money market account, a bond fund, and a stock fund. Which of these allocations sounds best to you?
    - Invest everything in a safe money-market fund.
    - Split your money evenly between the bond fund and stock fund.
    - Put everything into the stock fund, reasoning that by the time you retire, the year-to-year fluctuations in stock returns will have evened out.
  - You are a contestant on *Let's Make a Deal*, and have just won \$1,000. But you can exchange the winnings for two random payoffs. One is a coin flip with a payoff of \$2,500 if the coin comes up heads. The other is a flip of two coins with a payoff of \$6,000 if both coins come up heads. What will you do?
    - Keep the \$1,000 in cash.
    - Choose the single coin toss.
    - Choose the double coin toss.
  - Suppose you have the opportunity to invest in a start-up firm. If the firm is successful, you will multiply your investment by a factor of ten. But if it fails, you will lose everything. You think the odds of success are around 20%. How much would you be willing to invest in the start-up?
    - Nothing
    - 2 months' salary
    - 6 months' salary
  - Now imagine that to buy into the start-up you will need to borrow money. Would you be willing to take out a \$10,000 loan to make the investment?

## EXCEL APPLICATIONS

The Thirteenth Edition features Excel Spreadsheet Applications with Excel questions. A sample spreadsheet is presented in the text with an interactive version available in Connect and on the student resources site at [www.mhhe.com/Bodie13e](http://www.mhhe.com/Bodie13e).

**eXcel APPLICATIONS: Two-Security Model**

The accompanying spreadsheet can be used to analyze the return and risk of a portfolio of two risky assets. The model calculates expected return and volatility for varying weights of each security as well as the optimal risky and minimum-variance portfolios. Graphs are automatically generated for various model inputs. The model allows you to specify a target rate of return and solves for optimal complete portfolios composed of the risk-free asset and the optimal risky portfolio. The spreadsheet is constructed using the two-security return data (expressed as decimals, not percentages) from

Table 7.1. This spreadsheet is available in Connect or through your course instructor.

**Excel Question**

- Suppose your target expected rate of return is 11%.
  - What is the lowest-volatility portfolio that provides that expected return?
  - What is the standard deviation of that portfolio?
  - What is the composition of that portfolio?

	A	B	C	D	E	F
1	Asset Allocation Analysis: Risk and Return					
2		Expected	Standard	Correlation		
3		Return	Deviation	Coefficient	Covariance	
4	Security 1	0.08	0.12	0.3	0.0072	
5	Security 2	0.13	0.2			
6	T-bill	0.05	0			
7						
8	Weight	Weight		Expected	Standard	Reward to
9	Security 1	Security 2		Return	Deviation	Volatility
10	1	0		0.08000	0.12000	0.25000
11	0.9	0.1		0.08500	0.11559	0.30281
12	0.8	0.2		0.09000	0.11454	0.34922
13	0.7	0.3		0.09500	0.11395	0.38474
14	0.6	0.4		0.10000	0.11264	0.40771

## EXCEL EXHIBITS

Selected exhibits are set as Excel spreadsheets, and the accompanying files are available in Connect and on the student resources site at [www.mhhe.com/Bodie13e](http://www.mhhe.com/Bodie13e).

	A	B	C	D	E	F	G
1			Time until		PV of CF		Column (C)
2			Payment		(Discount rate =		times
3		Period	(Years)	Cash Flow	5% per period)	Weight*	Column (F)
4	A. 8% coupon bond	1	0.5	40	38.095	0.0395	0.0197
5		2	1.0	40	36.281	0.0376	0.0376
6		3	1.5	40	34.554	0.0358	0.0537
7		4	2.0	1040	855.611	0.8871	1.7741
8		Sum:			964.540	1.0000	1.8852
9							
10	B. Zero-coupon	1	0.5	0	0.000	0.0000	0.0000
11		2	1.0	0	0.000	0.0000	0.0000
12		3	1.5	0	0.000	0.0000	0.0000
13		4	2.0	1000	822.702	1.0000	2.0000
14		Sum:			822.702	1.0000	2.0000
15							
16	Semiannual int rate:	0.05					
17							
18	*Weight = Present value of each payment (column E) divided by the bond price.						

**Spreadsheet 16.1**  
Calculating the duration of two bonds  
Column sums subject to rounding error.

## PROBLEM SETS

We strongly believe that practice in solving problems is critical to understanding investments, so each chapter provides a good variety of problems. Select problems and algorithmic versions are assignable within Connect.

**PROBLEM SETS**

- The Fisher equation tells us that the real interest rate approximately equals the nominal rate minus the inflation rate. Suppose the inflation rate increases from 3% to 5%. Does the Fisher equation imply that this increase will result in a fall in the real rate of interest? Explain.
- You've just stumbled on a new dataset that enables you to compute historical rates of return on U.S. stocks all the way back to 1880. What are the advantages and disadvantages in using these data to help estimate the expected rate of return on U.S. stocks over the coming year?
- The Narnian stock market had a rate of return of 45% last year, but the inflation rate was 30%. What was the real rate of return to Narnian investors?
- You have \$5,000 to invest for the next year and are considering three alternatives:  
 a. A market fund with an expected return of 30 days of 3% per year.  
 b. A 30-day Treasury bill with a yield of 3% per year.  
 c. A 30-day Treasury bill with a yield of 3% per year.

## EXAM PREP QUESTIONS


Practice questions for the CFA® exams provided by Kaplan Schweser, A Global Leader in CFA® Education, are available in selected chapters for additional test practice. Look for the Kaplan Schweser logo. Learn more at [www.schweser.com](http://www.schweser.com).

**KAPLAN SCHWESER**

- Characterize each company in the previous problem as underpriced, overpriced, or properly priced.
- What is the expected rate of return for a stock that has a beta of 1.0 if the expected return on the market is 15%?
  - 15%.
  - More than 15%.
  - Cannot be determined without the risk-free rate.
- Kaskin, Inc., stock has a beta of 1.2 and Quinn, Inc., stock has a beta of .6. Which of the following statements is *most* accurate?
  - The expected rate of return will be higher for the stock of Kaskin, Inc., than that of Quinn, Inc.
  - The stock of Kaskin, Inc., has more total risk than the stock of Quinn, Inc.
  - The stock of Quinn, Inc., has more systematic risk than that of Kaskin, Inc.

## CFA PROBLEMS

We provide several questions adapted for this text from past CFA examinations in applicable chapters. These questions represent the kinds of questions that professionals in the field believe are relevant to the “real world.” Located at the back of the book is a listing of each CFA question and the level and year of the CFA exam it was included in for easy reference.



1. Leaf Products may issue a 10-year maturity fixed-income security, which might include a sinking fund provision and either refunding or call protection.
  - a. Describe a sinking fund provision.
  - b. Explain the impact of a sinking fund provision on:
    - i. The expected average life of the proposed security.
    - ii. Total principal and interest payments over the life of the proposed security.
  - c. From the investor's point of view, explain the rationale for demanding a sinking fund provision.
2. Bonds of Zello Corporation with a par value of \$1,000 sell for \$960, mature in five years, and have a 7% annual coupon rate paid semiannually.
  - a. Calculate the:
    - i. Current yield.
    - ii. Yield to maturity to the nearest whole percent (i.e., 3%, 4%, 5%, etc.).
    - iii. Realized compound yield for an investor with a 3-year holding period and a reinvestment rate of 6% over the period. At the end of three years, the 7% coupon bonds with two years remaining will sell to yield 7%.
  - b. Cite one major shortcoming for each of the following fixed-income yield measures:
    - i. Current yield.
    - ii. Yield to maturity.
    - iii. Realized compound yield.
3. On May 30, 2023, Janice Kerr is considering one of the newly issued 10-year AAA corporate bonds shown in the following exhibit.
 

Description	Coupon	Price	Callable	Call Price
Sentinal, due May 30, 2033	4.00%	100	Noncallable	NA
Colina, due May 30, 2033	4.20%	100	Currently callable	102

## EXCEL PROBLEMS

Selected chapters contain problems, denoted by an icon, specifically linked to Excel templates that are available in Connect and on the student resource site at [www.mhhe.com/Bodie13e](http://www.mhhe.com/Bodie13e).

\$49.75	500	\$50.25	100
49.50	800	51.50	100
49.25	500	54.75	300
49.00	200	58.25	100
48.50	600		

- a. If a market buy order for 100 shares comes in, at what price will it be filled?
- b. At what price would the next market buy order be filled?
- c. If you were a security dealer, would you want to increase or decrease your inventory of this stock?

9. You are bullish on Telecom stock. The current market price is \$50 per share, and you have \$5,000 of your own to invest. You borrow an additional \$5,000 from your broker at an interest rate of 8% per year and invest \$10,000 in the stock.

- a. What will be your rate of return if the price of Telecom stock goes up by 10% during the next year? The stock currently pays no dividends.
- b. How far does the price of Telecom stock have to fall for you to get a margin call if the maintenance margin is 30%? Assume the price fall happens immediately.

10. You are bearish on Telecom and decide to sell short 100 shares at the current market price of \$50 per share.

- a. How much in cash or securities must you put into your brokerage account if the broker's initial margin requirement is 50% of the value of the short position?
- b. How high can the price of the stock go before you get a margin call if the maintenance margin is 30% of the value of the short position?

**excel**  
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## E-INVESTMENTS EXERCISES

1. The OECD regularly publishes its economic outlook for the G20 countries as well as the world as a whole. You can find a recent report at [www.oecd.org/economic-outlook](http://www.oecd.org/economic-outlook). What is the forecast for U.S. inflation for the next year?
2. What is the one-year nominal interest rate on 1-year Treasury securities? You can find this at the St. Louis Fed data site [fred.stlouisfed.org](http://fred.stlouisfed.org).
3. What is the expected real rate based on your answers to (1) and (2)?
4. What is the real rate of interest on one-year inflation-protected T-bonds (TIPS)? You can also find this at the St. Louis Fed site, or from the online version of *The Wall Street Journal*, [online.wsj.com](http://online.wsj.com). Look for the tab for Markets, then Market Data.
5. Is the value for the expected real rate that you found in (3) consistent with the value you found in (4)?
6. How does the current real rate compare to its historical average?

## E-INVESTMENTS BOXES

These exercises provide students with simple activities to enhance their experience using the Internet. Easy-to-follow instructions and questions are presented so students can utilize what they have learned in class and apply it to today's data-driven world.



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# Supplements

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## INSTRUCTOR LIBRARY

The Connect Instructor Library is your repository for additional resources to improve student engagement in and out of class. You can select and use any asset that enhances your lecture. The Connect Instructor Library includes all of the instructor supplements for this text.

- **Solutions Manual** Updated by Nicholas Racculia, Saint Vincent College, in close collaboration with the authors, this Manual provides detailed solutions to the end-of-chapter problem sets.
- **Test Bank** The Test Bank has been revised to improve the quality of questions. Each question is ranked by level of difficulty, which allows greater flexibility in creating a test and also provides a rationale for the solution.
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- **Instructor's Manual** The Manual has been revised and improved for this edition. Each chapter includes a Chapter Overview, Learning Objectives, and Presentation of Material.
- **PowerPoint Presentation** These presentation slides contain figures and tables from the text, key points, and summaries in a visually stimulating collection of slides that you can customize to fit your lecture.

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## Supplements

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# The Investment Environment

**AN INVESTMENT IS** the *current* commitment of money or other resources in the expectation of reaping *future* benefits. For example, you might purchase shares of stock anticipating that the future proceeds will justify both the time your money is tied up as well as the risk of the investment. The time you will spend studying this text (not to mention its cost) also is an investment. You are forgoing either current leisure or the income you could be earning at a job in the expectation that your future career will be sufficiently enhanced to justify this commitment of time and effort. While these two investments differ in many ways, they share one key attribute that is central to all investments: You sacrifice something of value now, expecting to reap the benefits later.

This text can help you become an informed practitioner of investments. We will focus on investments in securities such as stocks, bonds, or derivatives contracts, but much of what we discuss will be useful in the analysis of any type of investment. The text will provide you with background in the organization of various securities markets; will survey the valuation and risk management principles useful in particular markets, such as those for bonds or stocks; and will introduce you to the principles of portfolio construction.

Broadly speaking, this chapter addresses several topics that will provide perspective for the material that is to come later. First, before delving into the topic of “investments,” we consider the role of financial assets in the economy. We discuss the relationship between securities and the “real” assets that actually produce goods and services for consumers, and we consider why financial assets are important to the functioning of a developed economy.

Given this background, we then take a first look at the types of decisions that confront investors as they assemble a portfolio of assets. These investment decisions are made in an environment where higher returns usually can be obtained only at the price of greater risk and in which it is rare to find assets that are so mispriced as to be obvious bargains. These themes—the risk–return trade-off and the efficient pricing of financial assets—are central to the investment process, so it is worth pausing for a brief discussion of their implications as we begin the text. These implications will be fleshed out in much greater detail in later chapters.

We provide an overview of the organization of security markets as well as its key participants. Finally, we discuss the financial crisis that began playing out in 2007 and peaked in 2008. The crisis dramatically illustrated the connections between the financial system and the “real”

(concluded)

side of the economy. We look at the origins of the crisis and the lessons that may be drawn about systemic risk. We close the chapter with an overview of the remainder of the text.

## 1.1 Real Assets versus Financial Assets

The material wealth of a society is ultimately determined by the productive capacity of its economy, that is, the goods and services its members can create. This capacity is a function of the **real assets** of the economy: the land, buildings, machines, and knowledge that can be used to produce goods and services.

In contrast to real assets are **financial assets** such as stocks and bonds. Such securities historically were no more than sheets of paper (and today, are far more likely to be, computer entries), and they do not contribute directly to the productive capacity of the economy. Instead, these assets are the means by which individuals in well-developed economies hold their claims on real assets. Financial assets are claims to the income generated by real assets (or claims on income from the government). If we cannot own our own auto plant (a real asset), we can still buy shares in Ford or Toyota (financial assets) and thereby share in the income derived from the production of automobiles.

While real assets generate net income to the economy, financial assets simply define the allocation of income or wealth among investors. When investors buy securities issued by companies, the firms use the money so raised to pay for real assets, such as plant, equipment, technology, or inventory. So investors' returns ultimately come from the income produced by the real assets that were financed by the issuance of those securities.



### Concept Check 1.1

Are the following assets real or financial?

- Patents
- Lease obligations
- Customer goodwill
- A college education
- A \$5 bill

The distinction between real and financial assets is apparent when we compare the balance sheet of U.S. households, shown in Table 1.1, with the composition of national wealth in the United States, shown in Table 1.2. Household wealth includes financial assets such as bank accounts, corporate stock, or bonds. However, these securities, which are financial assets of households, are *liabilities* of the issuers of the securities. For example, a bond that you treat as an asset because it gives you a claim on interest income and repayment of principal from Toyota is a liability of Toyota, which is obligated to make these payments. Your asset is Toyota's

liability. Therefore, when we aggregate over all balance sheets, these claims cancel out, leaving only real assets as the net wealth of the economy. National wealth consists of structures, equipment, inventories of goods, and land.<sup>1</sup>

<sup>1</sup>You might wonder why real assets held by households in Table 1.1 amount to \$44,599 billion, while total real assets in the domestic economy (Table 1.2) are far larger, at \$86,282 billion. A big part of the difference reflects the fact that real assets held by firms, for example, property, plant, and equipment, are included as *financial* assets of the household sector, specifically through the value of corporate equity and other stock market investments. Also, Table 1.2 includes assets of noncorporate businesses. Finally, there are some differences in valuation methods. For example, equity and stock investments in Table 1.1 are measured by market value, whereas plant and equipment in Table 1.2 are valued at replacement cost.

Assets	\$ Billion	% Total	Liabilities and Net Worth	\$ Billion	% Total
<b>Real assets</b>			<b>Liabilities</b>		
Real estate	\$ 37,558	24.4%	Mortgages	\$ 11,331	7.4%
Consumer durables	6362	4.1%	Consumer credit	4,163	2.7%
Other	679	0.4%	Bank and other loans	1,125	0.7%
<i>Total real assets</i>	\$ 44,599	28.9%	Other	624	0.4%
			<i>Total liabilities</i>	\$ 17,244	11.2%
<b>Financial assets</b>					
Deposits and money market shares	\$ 17,374	11.3%			
Life insurance reserves	1,854	1.2%			
Pension reserves	29,876	19.4%			
Corporate equity	28,285	18.3%			
Equity in noncorp. business	13,114	8.5%			
Mutual fund shares	11,661	7.6%			
Debt securities	5,772	3.7%			
Other	1,626	1.1%			
<i>Total financial assets</i>	\$ 109,562	71.1%	<i>Net worth</i>	136,917	88.8%
<i>TOTAL</i>	\$ 154,161	100.0%		\$ 154,161	100.0%

**Table 1.1**

Balance sheet of U.S. households

Note: Column sums may differ from total because of rounding error.

Source: *Flow of Funds Accounts of the United States*, Board of Governors of the Federal Reserve System, June 2021.

Assets	\$ Billion
Commercial real estate	\$20,842.9
Residential real estate	45,816.3
Equipment & intellectual property	10,316.2
Inventories	2,944.5
Consumer durables	6,361.9
<i>TOTAL</i>	\$86,282

Note: Column sums may differ from total because of rounding error.

Source: *Flow of Funds Accounts of the United States*, Board of Governors of the Federal Reserve System, June 2021.

**Table 1.2**

Domestic net worth

We will focus almost exclusively on financial assets. But keep in mind that the successes or failures of these financial assets ultimately depend on the performance of the underlying real assets.

## 1.2 Financial Assets

It is common to distinguish among three broad types of financial assets: fixed income, equity, and derivatives. **Fixed-income** or **debt securities** promise either a fixed stream of income or a stream of income determined by a specified formula. For example, a corporate



bond typically promises the bondholder a fixed amount of interest each year. Other so-called floating-rate bonds promise payments that depend on current interest rates. For example, a bond may pay an interest rate fixed at 2 percentage points above the rate paid on U.S. Treasury bills. Unless the borrower is declared bankrupt, the payments on these securities are either fixed or determined by formula. For this reason, the investment performance of debt securities typically is least closely tied to the financial condition of the issuer.

Fixed-income securities come in a tremendous variety of maturities and payment provisions. At one extreme, *money market* securities are short term, highly marketable, and generally of very low risk, for example, U.S. Treasury bills or bank certificates of deposit (CDs). In contrast, the fixed-income *capital market* includes long-term securities such as Treasury bonds, as well as bonds issued by federal agencies, state and local municipalities, and corporations. These bonds range from very safe in terms of default risk (e.g., Treasury securities) to relatively risky (e.g., high-yield or “junk” bonds). They also are designed with extremely diverse provisions regarding payments provided to the investor and protection against the bankruptcy of the issuer. We will take a first look at these securities in Chapter 2 and undertake a more detailed analysis of the debt market in Part Four.

Unlike debt securities, common stock, or **equity**, represents an ownership share in the corporation. Equityholders are not promised any particular payment. They receive any dividends the firm may pay and have prorated ownership in the real assets of the firm. If the firm is successful, the value of equity will increase; if not, it will decrease. The performance of equity investments, therefore, is tied directly to the success of the firm and its real assets. For this reason, equity investments tend to be riskier than investments in debt securities. Equity markets and equity valuation are the topics of Part Five.

Finally, **derivative securities** such as options and futures contracts provide payoffs that are determined by the prices of *other* assets such as bond or stock prices. For example, a call option on a share of Intel stock might turn out to be worthless if Intel’s share price remains below a threshold or “exercise” price such as \$50 a share, but it can be quite valuable if the stock price rises above that level.<sup>2</sup> Derivative securities are so named because their values derive from the prices of other assets. For example, the value of the call option will depend on the price of Intel stock. Other important derivative securities are futures and swap contracts. We will treat these in Part Six.

Derivatives have become an integral part of the investment environment. One use of derivatives, perhaps the primary use, is to hedge risks or transfer them to other parties. This is done successfully every day, and the use of these securities for risk management is so commonplace that the multitrillion-dollar market in derivative assets is routinely taken for granted. Derivatives also can be used to take highly speculative positions, however. Every so often, one of these positions blows up, resulting in well-publicized losses of hundreds of millions of dollars. While these losses attract considerable attention, they are in fact the exception to the more common use of such securities as risk management tools. Derivatives will continue to play an important role in portfolio construction and the financial system. We will return to this topic later in the text.

Investors and corporations regularly encounter other financial markets as well. Firms engaged in international trade regularly transfer money back and forth between dollars and other currencies. In London alone, over \$2 trillion of currency is traded each day and worldwide trading volume exceeds \$6 trillion.

<sup>2</sup>A call option is the right to buy a share of stock at a given exercise price on or before the option’s expiration date. If the market price of Intel remains below \$50 a share, the right to buy for \$50 will turn out to be valueless. If the share price rises above \$50 before the option expires, however, the option can be exercised to obtain the share for only \$50.

Investors also might invest directly in some real assets. For example, dozens of commodities are traded on exchanges such as the New York Mercantile Exchange or the Chicago Board of Trade. You can buy or sell corn, wheat, natural gas, gold, silver, and so on.

Commodity and derivative markets allow firms to adjust their exposure to various business risks. For example, a construction firm may lock in the price of copper by buying copper futures contracts, thus eliminating the risk of a jump in the price of its raw materials. Wherever there is uncertainty, investors may be interested in trading, either to speculate or to lay off their risks, and a market may arise to meet that demand.

## 1.3 Financial Markets and the Economy

We stated earlier that real assets determine the wealth of an economy, while financial assets merely represent claims on real assets. Nevertheless, financial assets and the markets in which they trade play several crucial roles in developed economies. Financial assets allow us to make the most of the economy's real assets.

### The Informational Role of Financial Markets

Stock prices reflect investors' collective assessment of a firm's current performance and future prospects. When the market is more optimistic about the firm, its share price will rise. That higher price makes it easier for the firm to raise capital and therefore encourages investment. In this manner, stock prices play a major role in the allocation of capital in market economies, directing it to the firms and applications with the greatest perceived potential. For example, in 2021, big investors poured huge investments into startup firms focusing on new battery technologies that could store energy created by renewables such as wind or solar power.<sup>3</sup> The prospect of big profits if this technology pans out prompted investors to allocate their funds toward these ventures. This dynamic was a good example of market incentives directing capital to applications where there is the prospect of a large payoff.

Do capital markets actually channel resources to the most efficient use? At times, they appear to fail miserably. Companies or whole industries can be "hot" for a period of time (think about the dot-com bubble that peaked and then collapsed in 2000), attract a large flow of investor capital, and then fail after only a few years.

The process seems highly wasteful. But we need to be careful about our standard of efficiency. No one knows with certainty which ventures will succeed and which will fail. It is therefore unreasonable to expect that markets will never make mistakes. The stock market encourages allocation of capital to those firms that appear *at the time* to have the best prospects. Many smart, well-trained, and well-paid professionals analyze the prospects of firms whose shares trade on the stock market. Stock prices reflect their collective judgment.

You may well be skeptical about resource allocation through markets. But if you are, take a moment to think about the alternatives. Would a central planner make fewer mistakes? Would you prefer that Congress make these decisions? To paraphrase Winston Churchill's comment about democracy, markets may be the worst way to allocate capital except for all the others that have been tried.

<sup>3</sup>Scott Patterson, "Investors Hunt for Battery Advances," *The Wall Street Journal*, September 10, 2021, p. B1.

### Consumption Timing

Some individuals are earning more than they currently wish to spend. Others, for example, retirees, spend more than they currently earn. How can you shift your purchasing power from high-earnings to low-earnings periods of life? One way is to “store” your wealth in financial assets. In high-earnings periods, you can invest your savings in financial assets such as stocks and bonds. In low-earnings periods, you can sell these assets to provide funds for your consumption needs. By so doing, you can “shift” your consumption over the course of your lifetime, thereby allocating your consumption to periods that provide the greatest satisfaction. Thus, financial markets allow individuals to separate decisions concerning current consumption from constraints that otherwise would be imposed by current earnings.

### Allocation of Risk

Virtually all real assets involve some risk. When Toyota builds its auto plants, for example, it cannot know for sure what cash flows those plants will generate. Financial markets and the diverse financial instruments traded in those markets allow investors with the greatest taste for risk to bear that risk, while other, less risk-tolerant individuals can, to a greater extent, stay on the sidelines. For example, if Toyota raises the funds to build its auto plant by selling both stocks and bonds to the public, the more optimistic or risk-tolerant investors can buy shares of its stock, while the more conservative ones can buy its bonds. Because the bonds promise to provide a fixed payment, the stockholders bear most of the business risk but reap potentially higher rewards. Thus, capital markets allow the risk that is inherent to all investments to be borne by the investors most willing to bear it.

This allocation of risk also benefits the firms that need to raise capital to finance their investments. When investors are able to select security types with the risk-return characteristics that best suit their preferences, each security can be sold for the best possible price. This facilitates the process of building the economy’s stock of real assets.

### Separation of Ownership and Management

Many businesses are owned and managed by the same individual. This simple organization is well suited to small businesses and, in fact, was the most common form of business organization before the Industrial Revolution. Today, however, with global markets and large-scale production, the size and capital requirements of firms have skyrocketed. For example, at the end in 2021, Chevron listed on its balance sheet about \$156 billion of property, plant, and equipment and total assets of \$240 billion. Corporations of such size simply cannot exist as owner-operated firms. Chevron actually has tens of thousands of stockholders with an ownership stake in the firm proportional to their holdings of shares.

Such a large group of individuals obviously cannot actively participate in the day-to-day management of the firm. Instead, they elect a board of directors that in turn hires and supervises the management of the firm. This structure means that the owners and managers of the firm are different parties. This gives the firm a stability that the owner-managed firm cannot achieve. For example, if some stockholders decide they no longer wish to hold shares in the firm, they can sell their shares to other investors, with no impact on the management of the firm. Thus, financial assets and the ability to buy and sell those assets in the financial markets allow for easy separation of ownership and management.

How can all of the disparate owners of the firm, ranging from large pension funds holding hundreds of thousands of shares to small investors who may hold only a single share, agree on the objectives of the firm? Financial markets can provide some guidance.

## Stakeholder Capitalism

The overwhelming orthodoxy in the business community since the 1970s was that the goal of the firm should be to maximize value and that corporate governance, for example, incentive packages for top management, should be designed to encourage that goal. The idea is that when value is maximized, we will all be in a better position to pursue our personal goals including, if we wish, support for “good causes.” But in 2019, America’s Business Roundtable, a group of CEOs of the country’s largest corporations, advocated for broader corporate goals that address the interests of other stakeholders, including employees, customers, and the communities in which firms operate. Their argument is that firms need to recognize and respond to ethical and societal considerations beyond their private pursuit of profit, in other words, that there is a built-in tension between *shareholder capitalism* and *stakeholder capitalism*.

The critics of value maximization argue that it does not provide incentives to firms to respond to important societal and economic challenges and that if firms concern themselves only with their own interests, they will ignore potential value-reducing impacts of their actions on other players. For example, should a firm increase its value by a trivial amount if it thereby increases unemployment for a large number of workers? Should it increase its value by gutting pension plans established for its former employees? Should it increase profits by evading the costs of clean production even if that would pollute the environment? These critics argue that firms should be encouraged and perhaps forced to take a broader view of their obligations to their many stakeholders.

They argue further that enlightened strategies can actually be financially beneficial, and that long-term value maximization requires *sustainable* investment strategies compatible with a healthier and more resilient economy in the future. These sustainability criteria are commonly grouped under the umbrella of environmental, social, and governance, or ESG, investing. In fact, the ESG sector has exploded in the last few years, with ESG-oriented mutual and exchange-traded funds in the United States capturing about one-fourth of new investments in 2020.

On the other hand, traditionalists are wary of an unfocused commitment to many competing and unspecified interests that could impede accountability. Should the firm, for example, offer a better service to its customers if doing so makes the company a less attractive place to work? Given these sorts of conflicting objectives, how should one judge whether managers

have performed well? Who will set these goals, and how much power is it appropriate to give to nonshareholders with little skin in the game? What incentives will remain for innovation and risk taking if corporate goals are set in the political arena? Is it right to downplay the importance of monetary success? After all, many institutions devoted to the public good and the economic security of individuals rely on the success of the endowment funds and pension funds that help pay for their activities. Finally, regardless of their preferences, competition may force firms to pursue value-maximizing strategies—if they don’t, they run the risk that competitors who do will put them out of business.

How might one thread this needle? One middle-ground approach focuses on encouraging *enlightened* self-interest. It can be value maximizing to establish a reputation as a good place to work if that helps the firm attract and retain good employees. It can be value maximizing to avoid scandal, disruption, and fines. It can also be value maximizing to provide products and treat customers in a manner that encourages repeat business. And if customers want goods produced by well-treated workers using environmentally responsible practices, it will be in the firm’s interest to design production processes with those goals in mind. Consumers also vote with their feet, and firms that wish to do well may face pressure to do good.

Of course, it would be naïve to believe that there will never be conflicts between value maximization, even maximization of long-term value, and other social considerations. Potential conflicts may call for government intervention to nudge incentives in one direction or the other. For example, governments may tax polluting activities to make it value maximizing to reduce emissions. They may set and enforce antitrust rules to foster competition and prevent any one firm from becoming powerful enough to ride roughshod over the interests of customers and employees. They can demand transparency to allow outsiders to make informed judgments of how the company is behaving.

The world is full of slippery slopes and competing goals, and no economic system will at all times and in all places arrive at the best compromise between narrow self-interest and broader social impact. Enlightened capitalism that recognizes that long-term success is compatible with, and in fact may demand, consideration of the wider implications of corporate actions may strike as good a balance as one can hope for.

While the particular goals of each corporation’s many investors may vary widely, all shareholders will be better able to achieve those personal goals when the firm acts to enhance the value of their shares. For this reason, value maximization has for decades been widely accepted as a useful organizing principle for the firm. More recently, some observers have questioned this goal, arguing that the firm should attempt to balance the interests of its many stakeholders, for example, employees, customers, suppliers, and communities. The nearby box examines this debate.

Do managers really attempt to maximize firm value? It is easy to see how they might be tempted to engage in activities not in the best interest of shareholders. For example, they might engage in empire building or avoid risky projects to protect their own jobs or over-consume luxuries such as corporate jets, reasoning that the cost of such perquisites is largely borne by the shareholders. These potential conflicts of interest are called **agency problems** because managers, who are hired as agents of the shareholders, may pursue their own interests instead.

Several mechanisms have evolved to mitigate potential agency problems. First, compensation plans tie the income of managers to the success of the firm. A major part of the total compensation of top executives is often in the form of shares or stock options, which means that the managers will not do well unless the stock price increases, benefiting shareholders. (Of course, we've learned that overuse of options can create its own agency problem. Options can create an incentive for managers to manipulate information to prop up a stock price temporarily, giving them a chance to cash out before the price returns to a level reflective of the firm's true prospects. More on this shortly.) Second, while boards of directors have sometimes been portrayed as defenders of top management, they can, and in recent years, increasingly have, forced out management teams that are underperforming. Third, outsiders such as security analysts and large institutional investors such as mutual funds or pension funds monitor the firm closely and make the life of poor performers at the least uncomfortable. Such large investors today hold about half of the stock in publicly listed firms in the United States.

Finally, bad performers are subject to the threat of takeover. If the board of directors is lax in monitoring management, unhappy shareholders in principle can elect a different board. They can do this by launching a *proxy contest* in which they seek to obtain enough proxies (i.e., rights to vote the shares of other shareholders) to take control of the firm and vote in another board. Historically, this threat was usually minimal. Shareholders who attempt such a fight have to use their own funds, while management can defend itself using corporate coffers.

However, in recent years, the odds of a successful proxy contest have increased along with the rise of so-called activist investors. These are large and deep-pocketed investors, often hedge funds, that identify firms they believe to be mismanaged in some respect. They buy large positions in shares of those firms and then campaign for slots on the board of directors and/or for specific reforms.

### Example 1.1 Activist Investors and Corporate Control

Here are a few of the better-known activist investors, along with a sample of their more notable initiatives:

- Nelson Peltz, Trian. Trian gained a seat on General Electric's board of directors and pressured the company to cut costs, to return capital to shareholders, for example, through stock buybacks, and to downsize the firm.
- William Ackman, Pershing Square. Took 8.3% stake in software company ADP, where he pushed for management changes.
- Dan Loeb, Third Point. Took large position in Royal Dutch Shell and pressed the company to split into two independent firms, one focusing on its legacy business lines, such as oil exploration and refining, and the other on low-carbon and renewable energy sources.

- Carl Icahn. One of the earliest and most combative of activist investors. Pushed HP to accept a takeover bid made by Xerox.
- Christer Gardell, Cevia Capital. Cevia is the largest activist firm in Europe. In 2021, it built up a 5% stake in the insurer Avian and then pressured the company to commit to deeper cost reductions and to pay out £5 billion in dividends or stock repurchases.
- Paul Singer, Elliott Management. Built up a large stake in the U.K. drug manufacturer GlaxoSmithKline after GSK's disappointing performance in the development of a Covid vaccination. Elliott is now expected to demand a large say in the firm's future management.
- Engine No. 1. A newcomer to the field, this formerly little-known fund gained the backing of large institutional investors like BlackRock and Vanguard and won three seats on the board of ExxonMobil, filling them with candidates with backgrounds in green energy and operational expertise.

Aside from proxy contests, the real takeover threat is from other firms. If one firm observes another underperforming, it can acquire the underperforming business and replace management with its own team. The stock price should rise to reflect the prospects of improved performance, which provides an incentive for firms to engage in such takeover activity.

## Corporate Governance and Corporate Ethics

We've argued that securities markets can play an important role in facilitating the deployment of capital to the most productive uses. But market signals will help to allocate capital efficiently only if investors are acting on accurate information. We say that markets need to be *transparent* for investors to make informed decisions. If firms can mislead the public about their prospects, then much can go wrong.

Despite the many mechanisms to align incentives of shareholders and managers, the three years from 2000 through 2002 were filled with a seemingly unending series of scandals that collectively signaled a crisis in corporate governance and ethics. For example, the telecom firm WorldCom overstated its profits by at least \$3.8 billion by improperly classifying expenses as investments. When the true picture emerged, it resulted in the largest bankruptcy in U.S. history, at least until Lehman Brothers smashed that record in 2008. The next-largest U.S. bankruptcy was Enron, which used its now-notorious "special-purpose entities" to move debt off its own books and similarly present a misleading picture of its financial status. Unfortunately, these firms had plenty of company. Other firms such as Rite Aid, HealthSouth, Global Crossing, and Qwest Communications also manipulated and misstated their accounts to the tune of billions of dollars. And the scandals were hardly limited to the United States. Parmalat, the Italian dairy firm, claimed to have a \$4.8 billion bank account that turned out not to exist. These episodes suggest that agency and incentive problems are far from solved, and that transparency is far from complete.

Other scandals of that period included systematically misleading and overly optimistic research reports put out by stock market analysts. (Their favorable analysis was traded for the promise of future investment banking business, and analysts were commonly